

XI. *An Account of the Earthquakes which happened in Italy, from February to May 1783. By Sir William Hamilton, Knight of the Bath, F. R. S.; in a Letter to Sir Joseph Banks, Bart. P. R. S.*

Read July 3, 1783.

Naples, May 23, 1783.

I AM happy now to have it in my power to give you, and my brethren of the Royal Society, some little idea of the infinite damage done, and of the various phenomena exhibited, by the earthquakes (which began the 5th of February last, and continue to be sensibly, though less violently, felt to this day) in the two Calabrias, at Messina, and in the parts of Sicily nearest to the continent. From the most authentic reports, and accounts received at the offices of his Sicilian Majesty's secretary of state, we gathered in general, that the part of Calabria, which has been most affected by this heavy calamity, is that which is comprehended between the 38th and 39th degree, that the greatest force of the earthquakes seemed to have exerted itself from the foot of those mountains of the Apennines called the Monte Deio, Monte Sacro, and Monte Caulone, extending westward to the Tyrrene sea; that the towns, villages, and farm-houses, nearest these mountains, situated either on hills or in the plain, were totally ruined by the first shock of the 5th of February about noon; and that the

greatest mortality was there ; that in proportion as the towns and villages were at a greater distance from this center, the damage they received was less considerable ; but that even those more distant towns had been greatly damaged by the subsequent shocks of the earthquake, and especially by those of the 7th, the 26th, and 28th of February, and that of the 1st of March ; that from the first shock, the 5th of February, the earth continued to be in a continual tremor, more or less ; and that the shocks were more sensibly felt at times in some parts of the afflicted provinces than in others ; that the motion of the earth had been various, and, according to the Italian denomination, *vorticoso*, *orizontale*, and *oscillatorio*, either whirling like a vortex horizontal, or by pulsations, or beatings from the bottom upwards ; that this variety of motion had increased the apprehensions of the unfortunate inhabitants of those parts, who expected every moment that the earth would open under their feet, and swallow them up ; that the rains had been continual and violent, often accompanied with lightning and irregular and furious gusts of wind ; that from all these causes the face of the earth of that part of Calabria (comprehended as abovementioned between the 38th and 39th degrees) was entirely altered, particularly on the westward side of the mountains above named ; that many openings and cracks had been made in those parts ; that some hills had been lowered, and others quite levelled ; that in the plains, deep chasms had been made, by which many roads were rendered impassable ; that huge mountains had been split asunder, and parts of them driven to a considerable distance ; that deep vallies had been filled up by the mountains (which formed those vallies) having been detached by the violence of the earthquakes, and joined together ; that the course of some rivers had been altered ;

that many springs of water had appeared in places that were perfectly dry before; and that in other parts, springs that had been constant had totally disappeared; that near Laureana in Calabria Ultra, a singular phenomenon had been produced, that the surface of two whole tenements, with large olive and mulberry-trees therein, situated in a valley perfectly level, had been detached by the earthquake, and transplanted, the trees still remaining in their places, to the distance of about a mile from their first situations; and that from the spot on which they formerly stood hot water had sprung up to a considerable height, mixed with sand of a ferruginous nature; that near this place also some countrymen and shepherds had been swallowed up with their teams of oxen and their flocks of goats and sheep; in short, that beginning from the city of Amantea, situated on the coast of the Tyrrene sea in Calabria Citra, and going along the westward coast to Cape Spartivento in Calabria Ultra, and then up the eastern coast as far as the Cape d'Alice (a part of Calabria Citra on the Ionian sea), there is not a town or village, either on the coast or land, but what is either totally destroyed, or has suffered more or less, amounting in all to near four hundred, what are called here *Paeses*; a village containing less than an hundred inhabitants is not counted as a *Paese*.

The greatest mortality fell upon those towns and countries situated in the plain on the western side of the mountains Dejo, Sacro, and Caulone. At Casal Nuovo, the Princess Gerace, and upwards of 4000 of the inhabitants, lost their lives; at Bagnara, the number of dead amounts to 3017; Radicina and Palmi count their loss at about 3000 each; Terranuova about 1400; Seminari still more. The sum total of the mortality in both Calabrias and in Sicily, by the earthquakes

alone, according to the returns in the secretary of state's office at Naples, is 32,367; but I have good reason to believe that, including strangers, the number of lives lost must have been considerably greater, 40,000 at least may be allowed, and, I believe, without any exaggeration.

From the same office intelligence we likewise heard, that the inhabitants of Scilla on the first shock of the earthquake, the 5th of February, had escaped from their houses on the rock, and, following the example of their prince, taken shelter on the sea-shore; but that in the night-time the same shock, which had raised and agitated the sea so violently, and done so much damage on the point of the Faro of Messina, had acted with still greater violence there, for that the wave (which was represented to have been boiling hot, and that many people had been scalded by its rising to a great height) went furiously three miles inland, and swept off in its return 2473 of the inhabitants of Scilla, with the prince at their head, who were at that time either on the Scilla Strand, or in boats near the shore.

All accounts agreed, that of the number of shocks which have been felt since the beginning of this formidable earthquake, amounting to some hundreds, the most violent, and of the longest duration, were those of the 5th of February at 19½ (according to the Italian way of counting the hours); of the 6th of February, at 7 hours in the night; of the 27th of February, at 11¼ in the morning; of the first of March, at 8½ in the night; and that of the 28th of March, at 1½ in the night. It was this last shock that affected most the upper part of Calabria Ultra, and the lower part of the Citra, an authentic description of which you will see hereafter, in a letter which I received from the Marquis Ippolito, an accurate observer
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residing at Catanzaro in the upper Calabria. The first and the last shocks must have been tremendous indeed, and only these two were sensibly felt in this capital.

The accounts which this government has received from the province of Cosenza, are less melancholy than those from the province of Calabria Ultra. From Cape Suvero to the Cape of Cetraro on the western coast, the inland countries, as well as those on the coast, are said to have suffered more or less in proportion to their proximity to the supposed center of the earthquakes; and it has been constantly observed, that its greatest violence has been exerted, and still continues to be so, on the western side of the Appennines, precisely the celebrated Sila of the ancient Brutii, and that all those countries situated to the eastward of the Sila had felt the shocks of the earthquake, but without having received any damage from them. In the province of Cosenza there does not appear to be above 100 lives lost. In the last accounts from the most afflicted part of Calabria Ultra, two singular phenomena are mentioned. At about the distance of three miles from the ruined city of Oppido, there was a hill (the soil of which is a sandy clay) about 500 palms high, and 1300 in circumference at its basis. It was said, that this hill, by the shock of the 5th of February, jumped to the distance of about four miles from the spot where it stood into a plain called the Campo di Bassano. At the same time the hill on which the town of Oppido stood, which extended about three miles, divided in two, and as its situation was between two rivers, its ruins filled up the valley, and stopped the course of those rivers; two great lakes are already formed, and are daily increasing, which lakes, if means are not found to drain them, and give the rivers their due course, in a short time must infect the air greatly.

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From Sicily the accounts of the most serious nature were those of the destruction of the greatest part of the noble city of Messina, by the shock of the 5th of February, and of the remaining parts by the subsequent ones;—that the quay in the port had sunk considerably, and was in some places a palm and a half under water;—that the superb building, called the *Palazzata*, which gave the port a more magnificent appearance than any port in Europe can boast of, had been entirely ruined;—that the Lazaret had been greatly damaged; but that the citadel had suffered little;—that the mother church had fallen; in short, that Messina was no more;—that the tower at the point of the entrance of the *Faro* was half destroyed; and that the same hot wave, that had done such mischief at Scilla, had passed over the point of land at the *Faro*, and carried off about 24 people. The viceroy of Sicily likewise gave an account of some damage done by the earthquakes, but nothing considerable, at Melazzo, Patti, Terra di Santa Lucia, Castro Reale, and in the island of Lipari.

This, Sir, was the intelligence I was possessed of the end of last month; but as I am particularly curious, as you know, on the subject of volcanoes, and was persuaded in my own mind (from the present earthquakes being confined to one spot) that some great chemical operation of nature of the volcanic sort was the real cause of them; in order to clear up many points, and to come at truth, which you also well know, Sir, is exceedingly difficult, I took the sudden resolution to employ about twenty days (which was as much as I could allow, and have time to be out of Italy, in my way home, before the heats set in) in making the tour of such parts of Calabria Ultra and Sicily as had been, and were still, most affected by the earthquakes, and examining with my own eyes the phenomena above mentioned. I accordingly
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hired for that purpose a Maltese Speronara for myself, and a Neapolitan Felucca for my servants, and left Naples the 2d of May. I was furnished, by command of his Sicilian Majesty, with ample passports, and orders to the commanding officers of the different provinces to give me every assistance and protection in the pursuit of my object. I had a pleasant voyage in my Maltese Speronara (which are excellent boats, and the boatmen very skilful) along the Coast of the Principato Citra and Calabria Citra, after having passed the gulph of Policastro. At Cedraro I found the first symptoms of the earthquake, some of the principal inhabitants of that city having quitted their houses, and living in new erected barracks, though not a house in the whole town, as I could see, had suffered. At St. Lucido I perceived that the baron's palace and the church steeple had suffered, and that most of the inhabitants were in barracks. The barracks are just such sort of buildings as the booths of our country fairs, though indeed many I have seen are more like our pig-styes. As my object was to get as fast as possible to the center of the mischief, having little time, and much to see, I contented myself with a distant view of Maida, Nicastro, and Santo Eufemia, and pushed on to the town of Pizzo in Calabria Ultra, where I landed on the evening of the 6th of May. This town, situated on the sea, and on a volcanic tuffa *, had been greatly damaged by the earthquake of the 5th of February, but was completely ruined by that of the 28th of March. As the inhabitants of this town (amounting to about 5000) had sufficient warning, and had left their houses, and taken to barracks on the first shock the 5th of February, the mortality on the 28th of

* This was the only token of former volcanic explosions that I met with in Calabria.

March was inconsiderable ; but, from the barracks having been ill-constructed, and many situated in a very confined unwholesome spot, an epidemical disorder had taken place, and carried off many, and was still in fatal force whilst I was there, in spite of the wise endeavours of government to stop its progress. I fear, as the heats increase, the same misfortune will attend many parts of the unfortunate Calabria, as also the city of Messina. The inhabitants of Pizzo seemed to me to have habituated themselves already to their present inconvenient manner of living, and shops of every kind were opened in the streets of the barracks, which, except some few, are but poorly constructed. I was assured here, that the volcano of Stromboli, which is opposite, and in full view of, this town, and at the distance of about fifty miles, had smoked less, and thrown up a less quantity of inflamed matter during the earthquakes than it had done for some years past ; that slight shocks continued to be felt daily ; and the night I slept here, on board the *Speronara* drawn on shore, I was awakened with a smart one, which seemed to lift up the bottom of the boat, but it was not attended with any subterraneous noise. My servants, in the other boat, felt the same. The next day I ordered my boats to proceed to Reggio, and I went on horseback to Monteleone, about six miles from Pizzo, up hill, on a road of loose stones and clay, scarcely passable in this season, but through the most beautiful and fertile country I ever beheld : a perfect garden of olive-trees, mulberry-trees, fruit-trees, and vines ; and under these trees the richest crops of corn or lupins, beans or other vegetables, which seemed to thrive perfectly, though under a thick shade. This is the stile of the whole plain of Monteleone, except that here and there are vast woods of oak and olive-trees mixed, and the olive-

trees of such a size as I could never have conceived, being half as big as the oaks themselves, which are fine timber-trees, and more than treble the size of the olive-trees of the Campagna Felice. The olive woods, in some parts of the plain, are regularly planted in lines, and in others grow irregularly. Though the object of my present journey was merely to take a hasty view of the spots which had suffered so much by the calamity, my attention was continually called away, and I was lost in the admiration of the fertility and beauty of this rich province, exceeding by many degrees (as to the first point) every country I have yet seen. Besides the two rich products of silk and oil, in which this province surpasses every other, perhaps, in the whole world, it abounds with corn, wine, cotton, liquorice, fruit, and vegetables of every kind; and if its population and industry kept pace with its fertility, the revenue of Calabria Ultra might surely be more than doubled in a short time. I saw whole groves of mulberry-trees, the owners of which told me, did not let for more than five shillings an acre, when every acre would be worth at least five pounds, had they hands to gather the leaves and attend the silk-worms. The town of Monteleone, anciently Vibo Valentia, is beautifully situated on a hill, overlooking the sea and the rich plains above mentioned, bounded by the Apennines, and crowned by Aspramonte, the highest of them all, interspersed with towns and villages, which, alas! are no more than heaps of ruins. The town of Monteleone suffered little by the first shocks of the earthquake; but was greatly damaged by that of the 28th of March (though only twelve lives were lost), and all the inhabitants are reduced to live in barracks, many of which are well constructed with either planks or reeds, covered with plaister on the outside. As

this country has ever been subject to earthquakes, the barons had usually a barrack near their palace, to retire to on the least alarm of an earthquake. I inhabited here a magnificent one, consisting of many rooms well furnished, which was built by the present Duke of Monteleone's grand-father. I owe the safety and the expedition of the very interesting journey which I have taken through this province to this duke's goodness, as he was pleased at Naples to furnish me with a letter to his agent; in consequence of which, I was not only most hospitably and elegantly treated in his barrack, and supplied with excellent sure-footed horses for myself and servant, but also with two of his horse-guards, well acquainted with the cross roads of the country, without which it would have been impossible, with any degree of safety, to have visited every curious spot between Monteleone and Reggio, as I did, in four days. No one, that has not had the experience, can conceive the horrid state of the roads in Calabria, even in this season, nor the superior excellence of the horses of the country. All agreed here that every shock of the earthquake seemed to come with a rumbling noise from the westward, beginning usually with the horizontal motion, and ending with the vorticoſe, which is the motion that has ruined most of the buildings in this province. The same observation I found to be a general one throughout this province. I found it a general observation also, that before a shock of an earthquake, the clouds seemed to be fixed and motionless; and that immediately after a heavy shower of rain, a shock quickly followed. I spoke with many here and elsewhere, who were thrown down by the violence of some of the shocks; and several peasants in the country told me, that the motion of the earth was so violent, that the
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heads of the largest trees almost touched the ground from side to side; that during a shock, oxen and horses extended their legs wide asunder not to be thrown down, and that they gave evident signs of being sensible of the approach of each shock. I myself observed, that in the parts that have suffered most by the earthquakes, the braying of an ass, the neighing of a horse, or the cackling of a goose, always drove people out of their barracks, and was the occasion of many pater-nosters and ave-marias being repeated in expectation of a shock. From Monteleone I descended into the plain, having passed through many towns and villages which had been more or less ruined according to their vicinity to the plain. The town of Mileto, situated in a bottom, I saw was totally destroyed, and not a house standing. At some distance I saw Soriano and the noble Dominican convent a heap of ruins; but as my object was not to visit ruins, but the greater phenomena produced by the earthquakes, I went on to Rosarno. I must, however, first mention the most remarkable instance I met with of animals being able to live long without food, of which there have been many examples during these present earthquakes. At Soriano two fattened hogs, that had remained buried under a heap of ruins, were taken out alive the forty-second day; they were lean and weak, but soon recovered. One of his Sicilian majesty's engineers, who was present at the taking them out, gave me this information. It was evident to me, in this day's journey, that all habitations situated on high grounds, the soil of which is a gritty sand stone, somewhat like a granite, but without the consistence, had suffered less than those situated in the plain, which are universally levelled to the ground. The soil of the plain is a sandy clay, white, red, or brown; but

the white prevails most, and is full of marine shells, particularly scollop shells. This valley of clay is intersected in many parts by rivers and torrents coming from the mountains, which have produced wide and deep ravines all over the country. Soon after we had passed through the ruined town of St. Pietro, we had a distant view of Sicily, and the summit of Mount Etna, which smoked considerably. Just before we arrived at Rosarno, near a ford of the river Mamella we passed over a swampy plain, in many parts of which I was shewn small hollows in the earth, of the shape of an inverted cone: they were covered with sand, as was the soil near them. I was told that, during the earthquake of the 5th of February, from each of these spots a fountain of water mixed with sand had been driven up to a considerable height. I spoke to a peasant here, who was present, and was covered with the water and sand; but assured me, that it was not hot, as had been represented. Before this appearance, he said, the river was dry; but soon after returned and overflowed its banks. I afterwards found, that the same phenomenon had been constant with respect to all the other rivers in the plain during the formidable shock of the 5th of February. I think this phenomenon is easily explained, by supposing the first impulse of the earthquake to have come from the bottom upwards, which all the inhabitants of the plain attest to be fact; the surface of the plain suddenly rising, the rivers, which are not deep, would naturally disappear, and the plain, returning with violence to its former level, the rivers must naturally have returned, and overflowed, at the same time that the sudden depression of the boggy grounds would as naturally force out the water that lay hid under their surface. I observed in the other parts where this sort of phenomenon had been exhibited, that

the ground was always low and rushy. Between this place and Rosarno we passed the river Messano or Metauro (which is near the town above mentioned) on a strong timber bridge, 700 palm long, which had been lately built by the Duke of Monteleone. From the cracks made on the banks and in the bed of the river by the earthquake, it was quite separated in one part, and the level on which the piers were placed having been variously altered, the bridge has taken an undulated form, and the rail on each side is curiously scolloped; but the parts that were separated having been joined again, it is now passable. The duke's bridge-man told me also, that at the moment of the earthquake, this great river was perfectly dry for some seconds, and then returned with violence, and overflowed; and that the bridge undulated in a most extraordinary manner. When I mention the earthquake in the plain, it must be always understood the first shock of the 5th of February, which was by far the most terrible, and was the one that did the whole mischief in the plain, without having given any previous notice. The town of Rosarno, with the Duke of Monteleone's palace there, was entirely ruined; but the walls remained about six feet high, and are now fitting up as barracks. The mortality here did not much exceed 200 out of near 3000. It had been remarked at Rosarno, and the same remark has been constantly repeated to me in every ruined town that I have visited, that the male dead were generally found under the ruins in the attitude of struggling against the danger; but that the female attitude was usually with hands clasped over their heads, as giving themselves up to despair, unless they had children near them; in which case they were always found clasping the children in their arms, or in some attitude which indicated their anxious care to protect them; a strong instance
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of the maternal tendernefs of the fex ! The only building that remained unhurt at Rosarno was a strong built town gaol, in which were three notorious villains, who would probably have loft their lives had they been at liberty. After having dined in a barrack, the owner of which had loft five of his family by the earthquake, I proceeded to Laureana, often croffing the wide extended bed of the river Metauro. The environs of Laureana, which ftands on an elevation, is the garden of Eden itfelf ; nothing I ever faw can be compared to it. The town is confiderable ; but as the earthquake did not come on fuddenly, as in the plain, not a life was loft there ; but from a ficknefs, occafioned by hardfhips and fright, 52 have died fince. I lodged in the barracks of a fenfible gentleman of Mileto, Don Domenico Acquanetta, who is a principal proprietor of this town. He attended me the next day to the two tenements, called the Macini and Vaticano, mentioned in the former part of this letter, and which were faid to have changed their fituation by the earthquake. The fact is true, and eafily accounted for. Thefe tenements were fituated in a valley furrounded by high grounds, and the furface of the earth, which has been removed, had been probably long undermined by little rivulets, which come from the mountains, and now are in full view on the bare fpot the tenements had deferted. Thefe rivulets have a fufficiently rapid courfe down the valley, to prove its not being a perfect level as was reprefented. I fuppose the earthquake to have opened fome depositions of rain-water in the clay hills which furround the valley, which water, mixed with the loofe foil, taking its courfe fuddenly through the undermined furface, lifting it up with the large olive and mulberry-trees, and a thatched cottage, floated the entire piece of ground, with all its vegetation, about a mile
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down the valley, where it now stands, with most of the trees erect. These two tenements may be about a mile long, and half a mile broad. I was shewn several deep cracks in this neighbourhood, not one above a foot in breadth; but which, I was credibly assured, had opened wide during the earthquake, and swallowed up an ox, and near an hundred goats, but no countrymen, as was reported. In the valley above mentioned I saw the same sort of hollows in the form of inverted cones, out of which, I was assured, that hot water and sand had been emitted with violence during the earthquakes as at Rosarno; but I could not find any one who could positively affirm that the water had been really hot, although the reports which government received affirm it. Some of the sand thrown out here with the water has a ferruginous appearance, and seems to have been acted upon by fire. I was told, that it had also, when fresh, a strong smell of sulphur, but I could not perceive it.

From hence I went through the same delightful country to the town of Polistene. To pass through so rich a country, and not see a single house standing on it, is most melancholy indeed; wherever a house stood, there you see a heap of ruins, and a poor barrack, with two or three miserable mourning figures sitting at the door, and here and there a maimed man, woman, or child, crawling upon crutches. Instead of a town, you see a confused heap of ruins, and round about them number of poor huts or barracks, and a larger one to serve as a church, with the church bells hanging upon a sort of low gibbet; every inhabitant with a doleful countenance, and wearing some token of having lost a parent.

I travelled four days in the plain, in the midst of such misery as cannot be described. The force of the earthquake was so great there, that all the inhabitants of the towns were buried

either alive or dead under the ruins of their houses in an instant. The town of Polistene was large, but ill situated between two rivers, subject to overflow. 2100 out of about 6000 lost their lives here the fatal 5th of February. The Marquis St. Giorgio, the baron of this country, whom I found here, was well employed in assisting his tenants. He had caused the streets of his ruined town to be cleared of rubbish, and had erected barracks on a healthy spot near it, for the remainder of his subjects, and on a good plan. He had also constructed barracks of a larger size for the silk-worms, which I found already at work in them. This prince's activity and generosity is most praise-worthy, and, as far as I have seen hitherto, he is without a rival. I observed, that the town of St. Giorgio, on a hill about two miles from Polistene, though rendered uninhabitable, was by no means levelled like the towns in the plain. There was a nunnery at Polistene; being curious to see the nuns that had escaped, I asked the marquis to shew me their barracks; but, it seems, only one out of twenty-three had been dug out of her cell alive, and she was fourscore years of age. After having dined with the marquis in his humble barrack, near the ruins of his very magnificent palace, I went through a fine wood of olive, and another of chestnut trees, to Casal Nuovo, and was shewn the spot on which stood the house of my unfortunate friend the princess Gerace Grimaldi, who with more than four thousand of her subjects lost her life by the sudden explosion of the 5th of February (for so it appears to have been) that reduced this town to atoms. I was told by some here, who had been dug out of the ruins, that they felt their houses fairly lifted up, without having had the least previous notice. In other towns some walls and parts of houses are standing; but here you neither distinguish street or house,

house, all lye in one confused heap of ruins. An inhabitant of Casal Nuovo told me, he was on a hill at the moment of the earthquake, overlooking the plain, when feeling the shock, and turning towards the plain, instead of the town, he saw in the place of it a thick cloud of white dust like smoke, the natural effect of the crushing of the buildings, and the mortar flying off.

From hence I went through the towns of Castellace and Milicusco (both in the same condition as Casal Nuovo) to Terra Nuova, situated in the same lovely plain, between two rivers, which, with the torrents from the mountains, have, in the course of ages, cut deep and wide chasms in the soft sandy clay soil of which the whole plain is composed. At Terra Nuova the ravine or chasm is not less than 500 feet deep, and three quarters of a mile broad. What causes a confusion in all the accounts of the phenomena produced by this earthquake in the plain, is the not having sufficiently explained the nature of the soil and situation. They tell you, that a town has been thrown a mile from the place where it stood, without mentioning a word of a ravine; that woods and corn-fields had been removed in the same manner, when in truth it is but upon a large scale, what we see every day upon a smaller, when pieces of the sides of hollow ways, having been undermined by rain waters, are detached into the bottom by their own weight. Here, from the great depth of the ravine, and the violent motion of the earth, two huge portions of the earth, on which a great part of the town stood, consisting of some hundreds of houses, were detached into the ravine, and nearly across it, about half a mile from the place where they stood; and what is most extraordinary, several of the inhabitants of those houses, who had taken this singular leap in them, were nevertheless dug out alive, and some unhurt. I spoke to one myself who had taken this extraordinary journey in his house, with his wife and a

maid-servant : neither he nor his maid-servant were hurt ; but he told me, his wife had been a little hurt, but was now nearly recovered. I happened to ask him, what hurt his wife had received ? His answer, though of a very serious nature, will nevertheless, I am sure, make you smile, Sir, as it did me. He said, she had both her legs and one arm broken, and that she had a fracture on her skull so that the brain was visible. It appears to me, that the Calabresi have more firmness than the Neapolitans ; and they really seem to bear their excessive present misfortune with a true philosophic patience. Of 1600 inhabitants at Terra Nuova, only 400 escaped alive. My guide there, who was a priest and physician, had been shut up in the ruins of his house by the first shock of the earthquake, and was blown out of it, and delivered by the succeeding shock, which followed the first immediately. There are many well-attested instances of the same having happened elsewhere in Calabria. In other parts of the plain situated near the ravine, and near the town of Terra Nuova, I saw many acres of land with trees and corn-fields that had been detached into the ravine, and often without having been overturned, so that the trees and crops were growing as well as if they had been planted there. Other such pieces were lying in the bottom, in an inclined situation ; and others again that had been quite overturned. In one place, two of these immense pieces of land having been detached opposite to one another, had filled the valley, and stopped the course of the river, the waters of which were forming a great lake : and this is the true state of what the accounts mention of mountains that had walked, and joined together, stopped the course of the river, and formed a lake. At the moment of the earthquake the river disappeared here, as at Rosarno, and returning soon after, overflowed the

bottom of the ravine about three feet in depth, so that the poor people that had been thrown with their houses into the ravine from the top of it, and had escaped with broken bones, were now in danger of being drowned. I was assured, that the water was salt, like that of the sea; but this circumstance seems to want confirmation. The same reason I have given for the sudden disappearing of the river Metauro at Rosarno will account for the like phenomenon here, and in every part of the country where the rivers dried up at the moment of the earthquake. The whole town of Mollochi di Sotto near Terra Nuova, was likewise detached into the ravine, and a vineyard of many acres near it lies in the bottom of the ravine as I saw in a perfect order, but in an inclined situation: there is a foot-path through this vineyard, which has a singular effect, considering its present impracticable situation. Some water mills, that were on the river, having been jammed between two such detached pieces as above described, were lifted up by them, and are now seen on an elevated situation, many feet above the level of the river. Without the proper explanations it is no wonder that such facts should appear miraculous. I observed in several parts of the plain, that the soil with timber trees and crops of corn, consisting of many acres, had sunk eight and ten feet below the level of the plain; and in others again I perceived it had risen as many. It is necessary to remember, that the soil of the plain is a clay mixed with sand, which is easily moulded into any shape. In the plain, near the spots from whence the above mentioned pieces had been detached into the ravine, there were several parallel cracks, so that had the violence of the shocks of the earthquake continued, these pieces also would have probably followed. I remarked constantly in all my journey, that near every ravine, or hollow way, the parts of the plain adjoining

were full of large parallel cracks. The earth rocking with violence from side to side, and having a support on one side only, accounts well for this circumstance. From Terra Nuova I went to Oppido. This city is situated on a mountain of a ferruginous sort of gritty stone, unlike the clay soil of its neighbourhood, and is furrounded by two rivers in a ravine deeper and broader than that of Terra Nuova. Instead of the mountain on which Oppido was situated having split in two, and by its fall on the rivers, stopped their course and formed great lakes, as we were told; it was (as at Terra Nuova) huge pieces of the plain on the edge of the ravine, that had been detached into it, nearly filled it up, and stopped the course of the rivers, the waters of which are now forming two great lakes. It is true, that part of the rock on which Oppido stood was detached with several houses into the ravine; but that is a trifling circumstance in comparison of the very great tracts of land, with large plantations of vines and olive-trees, which have been detached from one side of the ravine clear over to the other, though the distance is more than half a mile. It is well attested, that a countryman, who was ploughing his field in this neighbourhood with a pair of oxen, was transported with his field and team clear from one side of a ravine to the other, and that neither he nor his oxen were hurt. After what I have seen, I verily believe this may have happened. A large volume might be composed of the curious facts and accidents of this kind produced by the earthquakes in the valley; and, I suppose, many will be recorded in the account of the late formidable earthquakes, which the Academy of Naples intend to publish, the president having already sent into Calabria fifteen members, with draughtsmen in proportion, to collect the facts, and make drawings for the sole purpose of giving

giving a satisfactory and ample account of the late calamity to the publick; but unless they attend, as I did, to the nature of the soil of the local where those accidents happened, their reports will generally meet with little credit, except from those who are professed dilettanti of miracles, and many such do certainly exist in this country. I met with a remarkable instance here of the degree of immediate distress to which the unfortunate inhabitants of the destroyed towns were reduced. Don Marcello Grillo, a gentleman of fortune, and of great landed property, having escaped from his house at Oppido, which was destroyed by the earthquake, and his money (no less than twelve thousand pieces of gold) having been buried under the ruins of it, remained several days without food or shelter during heavy rains, and was obliged to a hermit in the neighbourhood for the loan of a clean shirt. Having walked over the ruins of Oppido, I descended into the ravine, and examined carefully the whole of it. Here I saw, indeed, the wonderful force of the earthquake, which has produced exactly the same effects as I have described in the ravine of Terra Nuova, but on a scale infinitely greater. The enormous masses of the plain, detached from each side of the ravine, lie sometimes in confused heaps, forming real mountains, and having stopped the course of two rivers (one of which is very considerable) great lakes are already formed, and, if not assisted by nature or art, so as to give the rivers their due course, must infallibly be the cause of a general infection in the neighbourhood. Sometimes I met with a detached piece of the surface of the plain (of many acres in extent) with the large oaks and olive-trees, with lupins or corn under them, growing as well, and in as good order at the bottom of the ravine, as their companions, from whom they were separated, do on their native soil.

soil in the plain, at least 500 feet higher, and at the distance of about three quarters of a mile. I met with whole vineyards in the same order in the bottom, that had likewise taken the same journey. As the banks of the ravine, from whence these pieces came, are now bare and perpendicular, I perceived that the upper soil was a reddish earth, and the under one a sandy white clay, very compact, and like a soft stone; the impulse these huge masses received, either from the violent motion of the earth alone, or that assisted with the additional one of the volcanic exhalations set at liberty, seems to have acted with greater force on the lower and more compact stratum than on the upper cultivated crust: for I constantly observed, where these cultivated islands lay (for so they appeared to be on the barren bottom of the ravine) the under stratum of compact clay had been driven some hundred yards further, and lay in confused blocks, and, as I observed, many of those blocks were of a cubical form. The under soil having had a greater impulse, and leaving the upper in its flight, naturally accounts for the order in which the trees, vineyards, and vegetation, fell and remain at present in the bottom of the ravine. This curious fact, I thought, deserved to be recorded, but is not easily described by words. When the drawings and plans of the Academy are published, this account (imperfect as it is) may, perhaps, have its utility: had my time permitted, I would certainly have taken a draughtsman with me into Calabria. In another part of the bottom of the ravine there is a mountain composed of the same clay soil, and which was probably a piece of the plain detached by an earthquake at some former period; it is about 250 feet high, and about 400 feet diameter at its basis: this mountain, as is well attested, has travelled down the ravine near four miles, having been put in motion
by

by the earthquake of the 5th of February. The abundance of rain which fell at that time, the great weight of the fresh detached pieces of the plain, which I saw heaped up at the back of it, the nature of the soil of which it is composed, and particularly its situation on a declivity, accounts well for this phenomenon; whereas the reports which came to Naples, of a mountain, in a perfect plain, having leaped four miles, had rather the appearance of a miracle. I found some single timber trees also with a lump of their native soil at the roots, standing upright in the bottom of the ravine, and which had been detached from the plain above mentioned. I observed also, that many confused heaps of the loose soil detached by the earthquake from the plains on each side of the ravine, had actually run like a volcanic lava (having probably been assisted by the heavy rain) and produced many effects greatly resembling those of lava during their course down a great part of the ravine. At Santa Cristina, in the neighbourhood of Oppido, the like phenomena have been exhibited, and the great force of the earthquake of the 5th of February seems to have been exerted on these parts and at Casal Nuova and Terra Nuova. The phenomena exhibited by the earthquakes in other parts of the plains of Calabria Ultra are of the same nature; but trifling in comparison of those I have been describing. The barracks erected for the remaining inhabitants of the ancient city of Oppido, now in ruins, are on a healthy spot, at about the distance of a mile from the old town, where I found the baron of this country, the Prince of Cariati, usefully employed in the assistance of his unfortunate subjects. He shewed me two girls, one of about sixteen years of age, who had remained eleven days without food under the ruins of a house at Oppido: she had a child of five or six months old in her arms,
which

which died the fourth day. The girl gave me a clear account of her sufferings; having light through a small opening, she had kept an exact account of the number of days she had been buried. She did not seem to be in bad health, drinks freely, but has yet a difficulty in swallowing any thing solid. The other girl was about eleven years of age; she remained under the ruins six days only; but in so very confined and distressful a posture, that one of her hands, pressing against her cheek, had nearly worn a hole through it.

From Oppido I proceeded through the same beautiful country and ruined towns and villages to Seminara and Palmi. The houses of the former were not quite in such a ruined condition as those of the latter, whose situation is lower and nearer the sea. 1400 lives were lost at Palmi, and all the dead bodies have not been removed and burnt, as in most other parts I visited; for I saw myself two taken up whilst I was there, and I shall ever remember a melancholy figure of a woman in mourning, sitting upon the ruins of her house, her head reclined upon her hand and knee, and following with an anxious eager eye every stroke of the pick-axe of the labourers employed to clear away the rubbish, in hopes of recovering the corpse of a favourite child. This town was a great market for oil, of which there were upwards of 4000 barrels in the town at the time of its destruction, so that the barrels and jars being broken, a river of oil ran into the sea from it for many hours. The spilt oil mixed with the corn of the granaries, and the corrupted bodies, have had a sensible effect on the air. This I fear, as the heats increase, may prove fatal to the unfortunate remainder of the inhabitants of Palmi, who live in barracks near the ruined town. My guide told me, that he had been buried in the ruins of his house here by the first shock, and
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that after the second, which followed immediately, he found himself sitting astride of a beam at least fifteen feet high in the air. I heard of many such extraordinary escapes in all parts of the plain, where the earthquake has exerted its greatest force.

From Palmi I proceeded through the beautiful woody mountains of Bagnara and Solano; noble timber oak trees on high rocks, narrow vallies with torrents in their bottoms, the road dangerous both on account of robbers and precipices. My two guards, instead of leading the way, as they had hitherto done, now separated and formed an advanced and a rear-guard. The narrow road was often interrupted by the fallen rocks and trees during the earthquakes, and obliged us to seek a new and still more dangerous road; but the Calabrese horses are really as sure-footed as goats. In the midst of one of these passes we felt a very smart shock of an earthquake, accompanied by a loud explosion, like that of springing a mine: fortunately for us it did not, as I expected, detach any rocks or trees from the high mountains that hung over our heads. After having passed the woods of Bagnara, Sinopoli, and Solano, I went through rich corn-fields and lawns, beautifully bounded with woods and scattered trees, like our finest parks, and which continue varying for some miles till you come upon the top of an open plain on a hill, commanding the whole Faro of Messina, the coast of Sicily as far as Catania, with Mount Etna rising proudly behind it, which altogether composed the finest view imaginable. From thence I descended a horrid rocky road to the Torre del Pezzolo, where there is a country-seat and a village belonging to the Princess of Bagnara. There I found, that an epidemical disorder had already manifested itself, as it probably will in many other parts of this glorious but unhappy country,

in proportion as the heats increase, owing to the hardships suffered, and the air having been spoiled by new-formed lakes. Several fishermen assured me, that during the earthquake of the 5th of February at night, the sand near the sea was hot, and that they saw fire issue from the earth in many parts. This circumstance has been often repeated to me in the plain; and my idea is, that the exhalations which issued during the violent commotions of the earth were full of electrical fire, just as the smoke of volcanoes is constantly observed to be during violent eruptions; for I saw no mark, in any part of my journey, of any volcanic matter having issued from the fissures of the earth; and I am convinced, that the whole damage has been done by exhalations and vapours only. The first shock felt at this place, as I was assured, was lateral, and then vorticose, and exceedingly violent; but what they call violent here, must have been nothing in comparison of what was felt in the plain of Casa Nuova, Polistene, Palmi, Terra Nuova, Oppido, &c. &c. where all agreed in assuring me, that the violence of the fatal shock of the 5th of February was instantaneous, without warning, and from the bottom upwards; and indeed in those places, where the mortality has been so great, and where nothing is to be seen but a confused heap of ruins, without distinction of either streets or houses, the violence of that shock is sufficiently confirmed. From this place to Reggio the road on each side is covered with villas and orange groves. I saw not one house levelled to the ground; but perceived that all had been damaged, and were abandoned; and that the inhabitants were universally retired to barracks in these beautiful groves of orange, mulberry, and fig-trees, of which there are many in the environs of Reggio. One that I visited, and which is reckoned the richest in all this part of Magna Grecia, is about a mile and a half from the town of Reggio, and what

is remarkable, belongs to a gentleman whose Christian name is Agamemnon. The beauty of the agrume (the general name of all kind of orange, lemon, cedrate, and bergamot-trees) is not to be described; the soil being sandy, the exposition warm, and command of water, a clear rivulet being introduced at pleasure in little channels to the foot of each tree, is the reason of the wonderful luxuriance of these trees. Don Agamemnon assured me, it was a bad year when he did not gather from his garden (which is of no great extent) 170,000 lemons, 200,000 oranges (which I found as excellent as those of Malta), and bergamots enough to produce 200 quarts of the essence from their rinds. There is another singularity in these gardens, as I was assured, every fig-tree affords two crops of fruit annually; the first in June, the second in August. But to return to my subject, from which my attention was frequently called away by the extraordinary and uncommon beauty and fertility of this rich province; I arrived about sun-set at Reggio, which I found less damaged than I expected, though not a house in it is habitable or inhabited, and all the people live in barracks or tents; but after having been several days in the plain, where every building is levelled to the ground, a house with a roof, or a church with a steeple, was to me a new and refreshing object. The inhabitants of the whole country, that has been so severely afflicted with earthquakes, seem, however, to have so great a dread of going into a house, that when the earthquakes shall have ceased, I am persuaded, the greatest part of them will still continue to live in barracks. The barracks here (except some few that are even elegant) are ill constructed, as are in general throughout the country all barracks of towns that have been so little damaged as to allow the inhabitants to flatter themselves with a hope of being able to return to, and occupy,

their houses again, when the present calamity is at an end. Reggio has been roughly handled by the earthquakes, but is by no means destroyed. The archbishop, a sensible, active, and humane prelate, has distinguished himself from the beginning of the earthquakes to this day, having immediately disposed of all the superfluous ornaments of the churches, and of his own horses and furniture, for the sole relief of his distressed flock, with whom he cheerfully bears an equal share of every inconvenience and distress which such a calamity has naturally occasioned. Except in this instance, and very few others, indeed, I observed throughout my whole journey, a prevailing indolence, inactivity, and want of spirit, which is unfortunate, as such a heavy and general calamity can only be repaired by a disposition directly contrary to that which prevails; but as this government is indefatigable in its endeavours at remedying every present evil, and preventing such as may naturally be expected, it is to be hoped that the generous and wise dispositions lately made, will restore the energy that is wanting, and without which, one of the richest provinces in Europe is in danger of utter ruin. Silk and essence of bergamot, oranges and lemons, are the great articles of trade at Reggio. I am assured, that no less than 100,000 quarts of this essence is annually exported. The fruit, after the rind is taken off, is given to the cows and oxen; and the inhabitants of this town assure me, that the beef, at that season, has a strong and disagreeable flavour of bergamot. The worthy archbishop gave me an account of the earthquakes here in 1770 and 1780, which obliged the inhabitants (in number 16,400) to encamp or remain in barracks several months, without however having done any considerable damage to the town. I was assured here (where they have had such a long experience

rience of earthquakes) that all animals and birds are in a greater or less degree much more sensible of an approaching shock of an earthquake than any human being; but that geese, above all, seem to be the soonest and most alarmed at the approach of a shock: if in the water, they quit it immediately, and there are no means of driving them into the water for some time after. The mortality here, by the late earthquake of the 5th of February, corresponds with the apparent degree of damage done to the town, and does not exceed 126. As it happened about noon, and came on gently, the people of Reggio had time to escape; whereas, as I have often remarked, the shock in the unhappy plain was as instantaneous as it was violent and destructive. Every building was levelled to the ground, and the mortality was general, and in proportion to the apparent destruction of the buildings. Reggio was destroyed by an earthquake before the Marston war, and having been rebuilt by Julius Cæsar was called Reggio Julio. Part of the wall still remains, and is called the Julian Tower; it is built of huge masses of stone without cement. Near St. Peruto, between Reggio and the Cape Spartivento, there are the remains of a foundery, his present Catholic Majesty, when King of Naples, having worked silver mines in that neighbourhood; which were soon abandoned, the profit not having answered the expence. There are some towns in the neighbourhood of Reggio that still retain the Greek language. About fifteen years ago, when I made the tour of Sicily, I landed at Spartivento in Calabria Ultra, and went to Bova, where I found that Greek was the only language in use in that district. On the 14th of May I left Reggio, and was obliged (the wind being contrary) to have my boats towed by oxen to the Punta del Pezzolo, opposite Messina, from whence the current waisted us with great expedition

dition indeed into the port of Messina. The port and the town, in its half ruined state, by moon-light was strikingly picturesque. Certain it is, that the force of the earthquake (though very violent) was nothing at Messina and Reggio to what it was in the plain. I visited the town of Messina the next morning, and found, that all the beautiful front of what is called the Palazzata, which extended in very lofty uniform buildings, in the shape of a crescent, had been in some parts totally ruined, in others less; and that there were cracks in the earth of the quay, a part of which had sunk above a foot below the level of the sea. These cracks were probably occasioned by the horizontal motion of the earth in the same manner as the pieces of the plain were detached into the ravines at Oppido and Terra Nuova; for the sea at the edge of the quay is so very deep, that the largest ships can lie alongside; consequently the earth, in its violent commotion, wanting support on the side next the sea, began to crack and separate, and as where there is one crack there are generally others less considerable in parallel lines to the first, I suppose the great damage done to the houses nearest the quay has been owing to such cracks under their foundations. Many houses are still standing, and some little damaged, even in the lower part of Messina; but in the upper and more elevated situations, the earthquakes seem to have had scarcely any effect, as I particularly remarked. A strong instance of the force of the earthquake having been many degrees less here than in the plain of Calabria is, that the convent of Santa Barbara, and that called the Noviziato de' Gesuiti, both on an elevated situation, have not a crack in them, and that the clock of the latter has not been deranged in the least by the earthquakes that have afflicted this country for four months past, and which still continue in some degree.

degree. Besides, the mortality at Messina does not exceed 700 out of upwards of 30,000, the supposed population of this city at the time of the first earthquake, which circumstance is conclusive. I found, that some houses, nay a street or two, at Messina, were inhabited, and some shops open in them; but the generality of the inhabitants are in tents and barracks, which, having been placed in three or four different quarters, in fields and open spots near the town, but at a great distance one from the other, must be very inconvenient for a mercantile town; and unless great care is taken to keep the streets of the barracks, and the barracks themselves, clean, I fear that the unfortunate Messina will be doomed to suffer a fresh calamity from epidemical disorders, during the heat of summer. Indeed, many parts of the plain of Calabria seem to be in the same alarming situation, particularly owing to the lakes, which are forming from the course of rivers having been stopped, some of which, as I saw myself, were already green, and tending to putrefaction. I could not help remarking here, that the nuns, who likewise live in barracks, were constantly walking about, under the tuition of their confessor, and seemed gay, and to enjoy the liberty the earthquake had afforded them, and I made the same observation with respect to school-boys at Reggio; so that in my journal, which I wrote in haste, and from whence I have as hastily transcribed the imperfect account I send you, the remark stands thus: “*Earthquakes particularly pleasing to nuns and school-boys.*” Out of the cracks on the quay, it is said, that during the earthquakes fire had been seen to issue (as many I spoke with attested); but there are no visible signs of it, and I am persuaded it was no more than, as in Calabria, a vapour charged with electrical fire, or a kind of inflammable air. A curious circumstance happened here also,

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to prove that animals can remain long alive without food. Two mules belonging to the Duke of Belviso, remained under a heap of ruins, one of them twenty-two, and the other twenty-three days: they would not eat for some days, but drank water plentifully, and are now quite recovered. There are numberless instances of dogs remaining many days in the same situation; and a hen, belonging to the British vice-consul at Messina, that had been closely shut up under the ruins of his house, was taken out the twenty-second day, and is now recovered; it did not eat for some days, but drank freely; it was emaciated, and shewed little signs of life at first. From these instances, from those related before, of the girls at Oppido, and the hogs at Soriano, and from several others of the same kind, that have been related to me, but which being less remarkable I omit, one may conclude, that long fasting is always attended with great thirst, and total loss of appetite. From every inquiry I found, that the great shock of the 5th of February was from the bottom upwards, and not like the subsequent ones, which in general have been horizontal and vorticose. A circumstance worth remarking (and which was the same on the whole coast of the part of Calabria that had been most affected by the earthquakes) is, that a small fish called Cicirelli, resembling what we call in England white-bait, but of a greater size, and which usually lye at the bottom of the sea, buried in the sand, have been ever since the commencement of the earthquakes, and continue still to be, taken near the surface, and in such abundance, as to be the common food of the poorest sort of people; whereas, before the earthquakes, this fish was rare, and reckoned amongst the greatest delicacies. All fish, in general, have been taken in greater abundance, and with much greater facility, in those parts since they have been afflicted by earthquakes

earthquakes than before. I constantly asked every fisherman I met with on the coast of Sicily and Calabria, if this circumstance was true; and was as constantly answered in the affirmative; but with such emphasis, that it must have been very extraordinary. I suppose, that either the sand at the bottom of the sea may have been heated by the volcanic fire under it; or that the continual tremor of the earth has driven the fish out of their strong holds, just as an angler, when he wants a bait, obliges the worms to come out of the turf on a river side, by trampling on it with his feet, which motion never fails in its effect, as I have experienced very often myself. I found the citadel here had not received any material damage; but was in the same state as I had left it fifteen years ago. The Lazaret has some cracks in it, like those on the quay, and from a like cause. The port has not received any damage from the earthquakes. The officer who commanded in the citadel, and who was there during the earthquake, assured me, that on the fatal 5th of February, and the three following days, the sea, about a quarter of a mile from that fortress, rose and boiled in a most extraordinary manner, and with a most horrid and alarming noise, the water in the other parts of the Faro being perfectly calm. This seems to point out exhalations or eruptions from cracks at the bottom of the sea, which may very probably have happened during the violence of the earthquakes; all of which, I am convinced, have here a volcanic origin. On the 17th of May I left Messina, where I had been kindly and hospitably treated, and proceeded in my Speronara along the Sicilian coast to the point of the entrance of the Faro, where I went ashore, and found a priest who had been there the night between the 5th and 6th of February, when the great wave passed over that point, carried off boats, and above

twenty-four unhappy people, tearing up trees, and leaving some hundred weight of fish it had brought with it on the dry land. He told me, he had been himself covered with the wave, and with difficulty saved his life. He at first said the water was hot; but as I was curious to come at the truth of this fact, which would have concluded much, I asked him if he was very sure of it? and being pressed, it came to be no more than the water having been as warm as it usually is in summer. He said, the wave rose to a great height, and came on with noise, and such rapidity that it was impossible to escape. The tower on the point was half destroyed, and a poor priest that was in it lost his life. From hence I crossed over to Scilla. Having met with my friend the Padre Minasi, a Dominican friar, a worthy man and an able naturalist, who is a native of Scilla, and is actually employed by the Academy of Naples to give a description of the phenomena that have attended the earthquake in these parts, with his assistance on the spot, I perfectly understood the nature of the formidable wave that was said to have been boiling hot, and had certainly proved fatal to the baron of the country, the Prince of Scilla, who was swept off the shore into the sea by this wave, with 2473 of his unfortunate subjects. The following is the fact. The Prince of Scilla having remarked, that during the first horrid shock (which happened about noon the 5th of February) part of a rock near Scilla had been detached into the sea, and fearing that the rock of Scilla, on which his castle and town is situated, might also be detached, thought it safer to prepare boats, and retire to a little port or beach surrounded by rocks at the foot of the rock. The second shock of the earthquake, after midnight, detached a whole mountain, (much higher than that of Scilla, and partly calcareous,

and partly cretaceous), situated between the Torre del Cavallo and the rock of Scilla. This having fallen with violence into the sea (at that time perfectly calm) raised the fatal wave, which I have above described to have broken upon the neck of land, called the Punta del Faro, in the island of Sicily, with such fury, which returning with great noise and celerity directly upon the beach, where the prince and the unfortunate inhabitants of Scilla had taken refuge, either dashed them with their boats and richest effects against the rocks, or whirled them into the sea; those who had escaped the first and greatest wave were carried off by a second and third, which were less considerable, and immediately followed the first. I spoke to several men, women, and children here, who had been cruelly maimed, and some of whom had been carried into the sea by this unforeseen accident. Here, said one, my head was forced through the door of the cellar, which he shewed me was broken. There, said another, was I drove into a barrel. Then a woman would shew me her child, all over deep wounds from the stones and timber, &c. that were mixed with the water, and dashing about in this narrow port; but all assured me, they had not perceived the least symptom of heat in the water, though I dare say, Sir, you will read many well attested accounts of this water having been hot; of many dead bodies thrown up which appeared to have been parboiled by it; and of many living persons, who had evidently been scalded by this hot wave: so difficult is it to arrive at truth. Had I been satisfied with the first answer of the priest at the Punta del Faro, and set it down in my journal, who could have doubted but that this wave had been of hot water? Now that we are well acquainted with the cause of this fatal wave, we know it could not have been hot; but the testimony of so many unfortunate sufferers

from it, is decisive. A fact which I was told, and which was attested by many here, is very extraordinary indeed: a woman of Scilla, four months gone with child, was swept into the sea by the wave, and was taken up alive, floating on her back at some distance, nine hours after. She did not even miscarry, and is now perfectly well; and, had she not been gone up into the country, they would have shewn her to me. They told me, she had been used to swim, as do most of the women in this part of Calabria. Her anxiety and sufferings, however, had arrived at so great a pitch, that just at the time that the boat, which took her up, appeared, she was trying to force her head under water, to put a period to her miserable existence. The Padre Minasi told me another curious circumstance that happened in this neighbourhood, which to his knowledge was strictly true. A girl of about eighteen years of age, was buried under the ruins of a house six days, having had her foot, at the ankle, almost cut off by the edge of a barrel that fell upon it; the dust and mortar stopped the blood; she never had the assistance of a surgeon; but the foot of itself dropped off, and the wound is perfectly healed without any other assistance but that of nature. If of such extraordinary circumstances, and of hair-breadth escapes, an account was to be taken in all the destroyed towns of Calabria Ultra and Sicily, they would, as I said before, compose a large volume. I have only recorded a few of the most extraordinary, and such as I had from the most undoubted authority. In my way back to Naples (where I arrived the 23d of May) along the coast of the two Calabrias and the Principato Citra, I only went on shore at Tropea, Paula, and in the Bay of Palinurus. I found Tropea (beautifully situated on a rock overhanging the sea) but little damaged: however, all the inhabitants were in barracks.

barracks. At Paula the same. The fishermen here told me, they continued to take a great abundance of fish, as they had done ever since the commencement of the present calamity. At Tropea, the 15th of May, there was a severe shock of an earthquake, but of a very short duration. There were five shocks during my stay in Calabria and Sicily; three of them rather alarming: and at Messina, in the night-time, I constantly felt a little tremor of the earth, which has been observed by many of the Messinese. I am really ashamed, Sir, of sending such an unconnected hasty extract of my journal; but when I reflect, that unless I send it off directly, the Royal Society will be broken up for the summer season, and the subject will become stale before its next meeting; of two evils I prefer to chuse the least. Such rough draughts however (though ever so imperfect and incorrect) have, as in paintings, the merit of a first sketch, and a kind of spirit that is often lost when the picture is correctly finished. If you consider the fatigue and hurry of the journey I have just been taking; and that in the midst of the preparations for my other journey to England, which I propose to begin to-morrow, I have been writing this account, I shall hope then to be entitled to your indulgence for all its imperfections*. But before I take my leave, I will just sum up the result of my observations in Calabria and Sicily, and give you my reasons for believing that the present earthquakes are occasioned by the operation of a volcano, the seat of which seems to lye deep, either under the bottom of the sea, between the island of Stromboli and the coast of Calabria, or under the parts of the plain towards Oppido and

* *Quæramus ergo quid sit quod terram ab infimo moveat, quid; &c. . . . Hæc ex quibus causis accidant digna res est excuti.* See the whole passage very applicable here. *SENECA, Nat. Quæst. lib. VI. cap. 4.*

Terra Nuova. If on a map of Italy, and with your compass on the scale of Italian miles, you were to measure off 22, and then fixing your central point in the city of Oppido (which appeared to me to be the spot on which the earthquake had exerted its greatest force) form a circle (the radii of which will be, as I just said, 22 miles) you will then include all the towns, villages, that have been utterly ruined, and the spots where the greatest mortality has happened, and where there have been the most visible alterations on the face of the earth. Then extend your compass on the same scale to 72 miles, preserving the same center, and form another circle, you will include the whole of the country that has any mark of having been affected by the earthquake. I plainly observed a gradation in the damage done to the buildings, as also in the degree of mortality, in proportion as the countries were more or less distant from this supposed center of the evil. One circumstance I particularly remarked, if two towns were situated at an equal distance from this center, the one on a hill, the other on the plain, or in a bottom, the latter had always suffered greatly more by the shocks of the earthquakes than the former; a sufficient proof to me of the cause coming from beneath, as this must naturally have been productive of such an effect. And I have reason to believe, that the bottom of the sea, being still nearer the volcanic cause, would be found (could it be seen) to have suffered even more than the plain itself; but (as you will find in most of the accounts of the earthquake that are in the press, and which are numerous) the philosophers, who do not easily abandon their ancient systems, make the present earthquakes to proceed from the high mountains of the Apennines that divide Calabria Ultra, such as the Monte Dejo, Monte Caulone, and Aspramonte; I would ask them
this

this simple question, did the *Æolian* or *Lipari* islands (all which rose undoubtedly from the bottom of the sea by volcanic explosions at different, and perhaps very distant, periods) owe their birth to the *Apeninnes* in *Calabria*, or to veins of minerals in the bowels of the earth, and under the bottom of the sea? *Stromboli* an active volcano, and probably the youngest of those islands, is not above 50 miles from the parts of *Calabria* that have been most affected by the late earthquakes. The vertical shocks, or, in other words, those whose impulse was from the bottom upwards, have been the most destructive to the unhappy towns in the plain; did they proceed from *Monte Dejo*, *Monte Caulone*, or *Alipramonte*? In short, the idea I have of the present local earthquakes is, that they have been caused by the same kind of matter that gave birth to the *Æolian* or *Lipari* islands; that, perhaps, an opening may have been made at the bottom of the sea, and most probably between *Stromboli* and *Calabria Ultra* (for from that quarter all agree, that the subterraneous noises seem to have proceeded); and that the foundation of a new island or volcano may have been laid, though it may be ages, which to nature are but moments, before it is completed, and appears above the surface of the sea. Nature is ever active; but her actions are, in general, carried on so very slowly, as scarcely to be perceived by mortal eye, or recorded in the very short space of what we call history, let it be ever so ancient. Perhaps too, the whole destruction I have been describing may have proceeded simply from the exhalations of confined vapours, generated by the fermentation of such minerals as produce volcanoes, which have escaped where they met with the least resistance, and must naturally in a greater degree have affected the plain than the high and more solid grounds around it. When the account of the

Royal Academy of Naples is published, with maps, plans, and drawings, of the curious spots I have described, this rude and imperfect account will, I flatter myself, be of use: without the help of plans and drawings you well know, Sir, the great difficulty there is in making one's self intelligible on such a subject. The inclosed letter, which I received whilst I was in Calabria Ultra, from the Marquis Ippolito, a gentleman of Catanzaro, and an able naturalist, will give you the particulars of the phenomena that have been produced by the late earthquakes in Calabria Citra, my time having permitted me to visit only a part of that province. I once more then crave your kind indulgence, and that of the members of our respectable Society, if you should think proper to communicate this hasty paper to them.

I have the honour to be, &c.

